

### ABSTRACT

Previous MIMO systems have used spatially diverse antenna elements in order not to reduce the number of orthogonal channels that can be realised. The present invention recognises that this leads to large  
5 antenna sizes, as compared to multiple beam antenna systems which use closely spaced antenna elements. In order to provide a compact antenna unit, whilst still allowing a MIMO system to be exploited, the present invention recognises that polarisation diversity only can be used in a MIMO system without the need for spatially diverse antenna elements.  
10 Closely spaced antenna elements are used and this enables a compact MIMO antenna unit to be provided. In addition, such MIMO systems with polarisation diversity but no spatial diversity can advantageously be used in line of sight situations and also combined with multi-beam antenna systems to further increase capacity.